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NO DRAWINGS.

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COMPLETE SPECIFICATION.

Improvements in Cooking Utensils.

We, EDWARD MERCER, of Moorlands, The Park, Grasscroft, County of York and CLIFFORD NORTHFIELD, of 574 Broadway, Chadderton, County of Lancaster, both British Subjects, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in cooking utensils for the baking of bread and confectionery.

Bread, baking tins or pans are normally made from metal and are subject to denting or other mechanical damage thereby preventing the contents from falling therefrom and shortening the life of the tin or pan, and the object of the invention is the production of a baking tin from fibre-glass, capable of recovery from superficial damage.

It has been proposed to coat metal cooking utensils with polytetrafluoroethylene (p.t.f.e.) coating compositions, with siloxane resins and liquid siloxanes, with a silicone and polytetrafluoroethylene, with an organo-polysiloxane fluid and with a silicone resin consisting of a polyorgano-silane or a polyorgano-siloxane and containing from 0.05% to 5% by volume of finely divided carbon particles, having a particle size in the millimicron range and with an aqueous emulsion of an organo-polysiloxane fluid, to provide an anti-sticking surface to give a reduced tendency for materials to adhere to the surfaces.

According to the invention, a baking tin is formed of fibre-glass having applied thereto a thermo-setting resin and coated with silicone rubber or polyvinyl-organo-polysiloxane or polytetrafluoroethylene to provide a non-sticking surface to receive dough in the baking of bread and confectionery.

[*Price* 4*s*. 6*d*.]

The invention will be described with reference to the following examples:—

Example 1

A baking tin is formed of fibre glass 0.02 inches thick or of a woven or needle felt of fibre glass of 0.040 inches thick construction to provide a non-rigid material which is layered and laminated up to any required thickness and shaped or moulded to that of the required tin. The shaping or moulding of the materials may be carried out by using the thermo-setting resin as a dough mixed with fibreglass before injection moulding, and coating the moulding with epoxy resins or silicone rubbers. The resins for producing a non-stick surface may be silicone rubbers or a cold cure silastomer employing moisture as a catalyst.

The thermo-setting resin applied to the fibre-glass may be a polyamide, a co-polymer of hexafluoropropylene, silicone elastomer and high temperature epoxy resins. High temperature polyester resins may be used provided any styrene content is completely removed because of its toxic quality.

The fibre glass is coated with a silicone rubber based on methyl phenyl polysiloxane polymers in the form of cold cure elastomers in a pourable and workable state.

The fibre glass is previously treated by passing through a gas flame or heating to above 360° so that it contains a minimum of size and then treated with a primer.

The cold cure silicone rubbers are applied as a mixture 2:1 of material Ref. 9160 and Ref. 9161 as sold by Midland Silicones Limited containing a minimum of 0.5% of a catalyst such as an organo-tin compound e.g. butyl-tin-oxide, di-alkyl silicate soap, chloro-silane or carboxylate.

The steps in the production of the 'tin' are thus:—

The thermo-setting resins are applied to the fibre glass as a syrup and a wet lay-up technique is employed. This wet laid-up fibre glass reinforcement is then shaped round the appropriate moulding, and reinforcing pieces may be added. The moulding is then again cured by the appropriate method for the material used. Where thermo-setting resin powders are used injection moulding with the fibre glass mix as a random fibre, is used in conjunction with the powder prior to moulding.

The wet laid-up shape is then cured and the mould removed using the appropriate release agent. Where injection moulding is used the 'tins' so produced are, as already described, treated with the known release materials. Having now shaped the 'tins' these are then lined with the hot cured or cold cured silastomers by first applying a priming coat, then brush painting on and spraying. Curing is then effected according to the choice of material, either hot or cold.

Any trimming that is necessary is then done or strapping together of the 'tins'. These can, of course, be joined by drilling and riveting and covering the rivets with the same release agent. This method is used to build up the number of 'tins' to any specific number of units.

The 'tin' may be reinforced by applying an unsized thread or metal thread wound round the 'tin' or the thread may be pre-coated with silicone rubber and then wound around the tin.

The fibre glass must not interfere with the adhesiveness of the silicone rubber, and the fibre glass must not be de-generated when subjected to the high temperature involved namely 500° F to 550° F.

Silicone cold cure rubber has various viscosities and the materials 9160 and 9161 employed can be mixed in a ratio of 3:1 or 1:1 respectively which have been found to give satisfactory results.

In order to achieve the desired results where there is sugar present in the mix to be cooked in the 'tin', it has been found advantageous to use in addition to these cold curing compounds a hot cure silicone sold as S 2219 by Midland Silicones Limited which can be painted onto the surface of the cold cure compound onto a reinforced or moulded 'tin'.

As an alternative to this cold cure Silastomer (Trade Mark), materials such as epoxy resins which can be supported with fibre-glass by conventional means and shaped accordingly to the size of the 'Tin' required, or other resins may be used such as poly-oxymethylene or a high density butyl poly-styrene; these can of course be smoothed off to a good finish which is desirable, then treated internally with the non-stick materials.

Having manufactured the 'Tins', which can be done as single or multiple units, it is necessary owing to automation generally existing in large baking plants, to have reinforcements at positions where excess wear takes place or where change of direction is initiated. The reinforcement may be as follows:—

A suitably shaped fibre-glass reinforced plastic or resin surrounding the 'Tin' or 'Tins' is made and attached to the base and sides of the 'Tins' during the actual moulding process while the surfaces are still 'wet' and 'clean', so that a good adhesion between the two is achieved.

If it is desired to reinforce the 'Tins' with metal then it is necessary that this metal surface be shot blasted, de-greased and primed, suitably to accept a 'wet' surface on the 'Tins', in order that a good adhesion can again be achieved in the position required.

Example 2.

A hot moulding process for coating the 'tins' may be employed by using fluorinated siloxane polymers or high mould powders such as of p.t.f.e. where a general practice or technique can be used to achieve the desired shape of the baking 'Tins', the 'tins' being then attached together by rivets of a similar material or by making the moulds fit in by interlocking devices into a frame.

The internal surface will adhere to the walls of the 'Tins', to give a neat and tidy exposed surface of these non-sticking materials for the contents which are to be baked. p.t.f.e. is available from Hoehcsht Chemicals Limited. The p.t.f.e. may be incorporated in or applied to the silicone rubber.

Example 3.

The 'Tins' may be preheated by shot blasting and/or de-greasing and priming with a tetra-ethylortho silicate or ethyl hexoate and then employing a cold cure silastomer (Trade Mark) such as that based upon methyl phenyl polysiloxane polymers by incorporating a catalyst, to obtain the desired mixture of materials 9160 and 9161 say at 2:1 or 1:1, and then to add in small quantities solvents such as methyl-iso butyl ketone and n-butanol e.g. 5% to 10% by weight or using di-methyl silicone fluid 4% before coating as described with reference to Example 1.

The silicone rubber mix is applied and left to cure or slightly heat cured if heating up of the process is required at between 20°C and 80°C. A temperature of 50/55°C is found to give good results.

The 'Tins' may be formed as separate units or they may be mounted in sets of three or four secured by metal or reinforced plastic materials or resin strapping.

It has been found that 'Tins' made and coated as above described with a low coefficient of friction and good conductivity result in an improved 'tin' requiring no greasing, and also having improved length of life and washing properties giving a good clean hygienic surface.

WHAT WE CLAIM IS:—

1. A baking tin for the baking of bread and confectionery comprising a 'tin' formed of fibre-glass having applied thereto a thermo-setting resin and coated with silicone rubber or polyvinyl-organo-polysiloxane or polytetrafluoroethylene to provide a non-sticking surface to receive dough in the baking of bread and confectionery.

2. A baking tin as in Claim 1 in which the coating is of fluorinated siloxane polymers or polytetrafluoroethylene applied by a hot moulding process.

3. A baking tin as in any of the preceding claims in which the tin is reinforced with thread or metal thread wound round the tin.

4. A baking tin substantially as described with reference to the foregoing examples.

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